JMYT-252US

Appln. No.: 10/018,607

Amendment Dated December 19, 2005 Reply to Office Action of October 19, 2005

<u>Amendments to the Claims:</u> This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

- (Original) An electrically conducting gas diffusion substrate comprising an electrically conducting porous structure and a first catalytic component, characterised in that the first catalytic component comprises a first catalyst supported on an electrically nonconducting support.
- (Original) A gas diffusion substrate according to claim 1 wherein the first catalyst is a gas-phase catalyst.
- 3. (Previously Presented) A gas diffusion substrate according to claim 1 wherein the first catalyst is one or more noble metals or non-noble metals or a combination thereof.
- 4. (Previously Presented) A gas diffusion substrate according to claim 1 wherein the first catalyst is one or more metals selected from the group consisting of platinum, palladium, ruthenium, rhodium, gold, chromium, molybdenum, nickel and manganese or a combination thereof.
- 5. (Previously Presented) A gas diffusion substrate according to claim 1 wherein the electrically non-conducting support is an oxidic support.
- 6. (Original) A gas diffusion substrate according to claim 5 wherein the oxidic support is alumina, silica, ceria, zirconia, an oxide of iron, a manganese oxide or titania.
- 7. (Previously Presented) A gas diffusion substrate according to claim 1 wherein the porous structure is a woven or non-woven fibrous material.
- 8. (Previously Presented) A gas diffusion substrate according to claim 1 wherein the porous structure is formed from a polymer.
- 9. (Previously Presented) A gas diffusion substrate according to claim 1 wherein the porous structure is a metal mesh.

- 10. (Previously Presented) A gas diffusion substrate according to claim 7 wherein the porous structure further comprises a filler material.
- 11. (Previously Presented) A gas diffusion substrate according to claim 1 wherein the first catalytic component is embedded within the porous structure.
- 12. (Previously Presented) A gas diffusion substrate according to claim 1 wherein the first catalytic component is applied to the porous structure as a surface layer.
- 13. (Original) A gas diffusion substrate according to claim 12 wherein the first catalytic component is mixed with electrically conducting particles.
- 14. (Withdrawn) A process for the preparation of a gas diffusion substrate according to claim 1, said process comprising in-filling a pre-formed porous structure with the first catalytic component or applying the first catalytic component to the surface of a preformed porous structure.
- 15. (Previously Presented) A gas diffusion electrode comprising an electrically conducting gas diffusion substrate as claimed in claim 1 and a second catalytic component.
- 16. (Original) A gas diffusion electrode according to claim 15 wherein the second catalytic component comprises an electrocatalyst.
- 17. (Previously Presented) A gas diffusion electrode according to claim 15 wherein the second catalytic component is a precious metal or a transition metal as the metal or metal oxide, either unsupported or supported in a dispersed form on a carbon support; a carbon or an organic complex, in the form of a high surface area finely divided powder or fibre, or a combination of thereof.
- 18. (Previously Presented) A gas diffusion electrode according to claim 17 wherein the second catalytic component is a platinum/ruthenium alloy supported on carbon black or platinum supported on carbon black.

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- 19. (Previously Presented) A membrane electrode assembly comprising a gas diffusion electrode as claimed in claim 15, a second gas diffusion electrode, and a solid polymer membrane.
- 20. (Previously Presented) A membrane electrode assembly comprising a gas diffusion electrode as claimed in claim 15, a gas diffusion substrate and a solid polymer membrane, wherein an electrocatalyst layer is applied to the side of the membrane facing the gas diffusion substrate.
- 21. (Previously Presented) A membrane electrode assembly comprising a gas diffusion substrate as claimed in claim 1, a gas diffusion electrode and a solid polymer membrane, wherein an electrocatalyst layer is applied to the side of the membrane facing the gas diffusion substrate.
- 22. (Previously Presented) A membrane electrode assembly comprising a gas diffusion substrate as claimed in claim 1, a second gas diffusion substrate, and a solid polymer membrane, wherein an electrocatalyst layer is applied to both sides of the solid polymer membrane.
- 23. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 1.
- 24. (Previously Presented) A fuel cell comprising a gas diffusion electrode as claimed in claim 15.
- 25. (Previously Presented) A fuel cell comprising a membrane electrode assembly as claimed in claim 19.
- 26. (Previously Presented) A gas diffusion substrate according to claim 8 wherein the porous structure further comprises a filler material.
- 27. (Previously Presented) A gas diffusion substrate according to claim 9 wherein the porous structure further comprises a filler material.

- 28. (Previously Presented) A gas diffusion electrode according to claim 16 wherein the second catalytic component is a precious metal or a transition metal as the metal or metal oxide, either unsupported or supported in a dispersed form on a carbon support; a carbon or an organic complex, in the form of a high surface area finely divided powder or fibre, or a combination of thereof.
- 29. (Previously Presented) A membrane electrode assembly comprising a gas diffusion electrode as claimed in claim 16, a second gas diffusion electrode, and a solid polymer membrane.
- 30. (Previously Presented) A membrane electrode assembly comprising a gas diffusion electrode as claimed in claim 17, a second gas diffusion electrode, and a solid polymer membrane.
- 31. (Previously Presented) A membrane electrode assembly comprising a gas diffusion electrode as claimed in claim 18, a second gas diffusion electrode, and a solid polymer membrane.
- 32. (Previously Presented) A membrane electrode assembly comprising a gas diffusion electrode as claimed in claim 16, a gas diffusion substrate and a solid polymer membrane, wherein an electrocatalyst layer is applied to the side of the membrane facing the gas diffusion substrate.
- 33. (Previously Presented) A membrane electrode assembly comprising a gas diffusion electrode as claimed in claim 17, a gas diffusion substrate and a solid polymer membrane, wherein an electrocatalyst layer is applied to the side of the membrane facing the gas diffusion substrate.
- 34. (Previously Presented) A membrane electrode assembly comprising a gas diffusion electrode as claimed in claim 18, a gas diffusion substrate and a solid polymer membrane, wherein an electrocatalyst layer is applied to the side of the membrane facing the gas diffusion substrate.

- 35. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 2.
- 36. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 3.
- 37. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 4.
- 38. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 5.
- 39. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 6.
- 40. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 7.
- 41. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 8.
- 42. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 9.
- 43. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 10.
- 44. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 11.
- 45. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 12.

- 46. (Previously Presented) A fuel cell comprising a gas diffusion substrate as claimed in claim 13.
- 47. (Previously Presented) A fuel cell comprising a gas diffusion electrode as claimed in claim 16.
- 48. (Previously Presented) A fuel cell comprising a gas diffusion electrode as claimed in claim 17.
- 49. (Previously Presented) A fuel cell comprising a gas diffusion electrode as claimed in claim 18.
- 50. (Previously Presented) A fuel cell comprising a membrane electrode assembly as claimed in claim 20.
- 51. (Previously Presented) A fuel cell comprising a membrane electrode assembly as claimed in claim 21.
- 52. (Previously Presented) A fuel cell comprising a membrane electrode assembly as claimed in claim 22.